

CLAIMS

1. A dual-direction pulley system comprising:
 - a first main pulley having an actuator operably attached thereto;
 - a second and third main pulleys;
 - a first cable wrapped at least part of the way around said first main pulley and fixed to said first main pulley and wrapped at least part of the way around said second main pulley and affixed thereto;
 - a second cable wrapped at least part of the way around said first main pulley opposite said first cable and fixed to said first main pulley and wrapped at least part of the way around said second main pulley and affixed thereto;
 - a tensioner cable, one end of which is wrapped at least partially around said second main pulley opposite of said first cable, and the other end of which is wrapped at least partially around said third main pulley opposite of said second cable; and
 - a pulley arm reactive to the movement of either of said second and third main pulleys, said pulley arm attached to a load mechanism, wherein movement of said actuator causes movement of said pulley arm to engage said load mechanism.
2. The dual-direction pulley system according to claim 1, further comprising a tensioner pulley, said tensioner cable wrapped at least part of the way around said tensioner pulley.
3. The dual-direction pulley system according to claim 1, wherein said actuator is angularly adjustable relative to said first main pulley.
4. The dual-direction pulley system according to claim 3, wherein said actuator includes a retractable pin, wherein said first main pulley includes a plurality of openings for

receiving said retractable pin, and wherein an angular orientation of said actuator relative to said first main pulley is dependent upon which opening said retractable pin is in engagement with.

5. The dual-direction pulley system according to claim 1, further comprising a first catch fixed on said second main pulley and a second catch fixed on said third main pulley, said first catch engaging said pulley arm upon movement of said actuator in a first direction; said second catch engaging said pulley arm upon movement of said actuator in a second direction opposite to said first direction.

6. The dual-direction pulley system according to claim 5, wherein said pulley arm is pivotal about a common axis with said second and third main pulleys.

7. The dual-direction pulley system according to claim 1, wherein said loading mechanism comprises a loading pulley and a loading cable, and wherein said loading cable has a first end that is fixed and a second end that is connected to a load, and wherein said loading cable wraps at least part of the way around said loading pulley.

8. The dual-direction pulley system according to claim 1, further comprising a frame on which said first, second, and third main pulleys are mounted, said frame having a hollow member; said first and second cables being enclosed along at least part of their length within said hollow member.

9. The dual-direction pulley system according to claim 1, further comprising a frame and a seat supported by said frame, and wherein said actuator comprises a lever, said seat being placed on said frame such that a user seated in said seat can perform leg extension exercises by rotating said lever in a first direction and leg curl exercises by rotating said lever in a second direction opposite to said first direction.

10. The dual-direction pulley system according to claim 9, wherein said actuator further comprises a first pad and a second pad, and wherein said second pad is mounted to said lever such that it is adapted to hold a leg of a user in place between said first pad and said second pad during leg curl exercises.

11. The dual-direction pulley system according to claim 10, wherein said second pad is eccentrically rotatably mounted to said lever.

12. An exercise apparatus for providing resistance to movement in opposite directions comprising:

a frame;

an actuating lever pivotally mounted to said frame, said actuating lever including a portion suitable for engagement with a body part of a user, said actuating lever being pivotal in a clockwise direction and a counterclockwise direction; and

a pulley system for providing resistance to rotation of said actuating lever when said actuating lever is moved in said clockwise direction and said counterclockwise direction.

13. The exercise apparatus according to claim 12, wherein said pulley system includes a first main pulley, a second main pulley, and a third main pulley; wherein said actuating lever is attached to said first main pulley such that rotation of said actuating lever causes rotation of said first main pulley, wherein a first cable connects said first main pulley with said second main pulley; wherein a second cable connects said first main pulley with said third main pulley, and wherein a tensioning cable connects said second and third main pulleys such that rotation of said first main pulley causes corresponding rotation of said second and third main pulleys substantially without creating slack in said first and second cables.

14. The exercise apparatus according to claim 13 wherein said first and second main pulleys are connected to a load such that when said first main pulley is rotated in a clockwise direction, rotation of said second main pulley is resisted by said load, and when said first main pulley is rotated in a counterclockwise direction, rotation of said third main pulley is resisted by said load.

15. The exercise apparatus according to claim 14, wherein said pulley system further comprises a pulley arm connected to said load; wherein said second main pulley includes a catch that engages said pulley arm when said first main pulley is rotates in said clockwise direction; and wherein said third main pulley includes a catch that engages said pulley arm when said first main pulley rotates in said counterclockwise direction.

16. The exercise apparatus according to claim 13, wherein an angular orientation between said actuating lever and said first main pulley may be selectively adjusted to create multiple rest positions for said actuating lever.

17. The exercise apparatus according to claim 12, wherein said pulley system comprises:

a first main pulley attached to said actuating lever;

a second and third main pulleys;

a first cable wrapped at least part of the way around said first main pulley and fixed to said first main pulley and wrapped at least part of the way around said second main pulley and affixed thereto;

a second cable wrapped at least part of the way around said first main pulley opposite said first cable and fixed to said first main pulley and wrapped at least part of the way around said second main pulley and affixed thereto;

a tensioner cable, one end of which is wrapped at least partially around said second main pulley opposite of said first cable, and the other end of which is wrapped at least partially around said third main pulley opposite of said second cable; and

a pulley arm reactive to the movement of either of said second and third main pulleys, said pulley arm attached to a load mechanism, wherein movement of said actuating lever causes movement of said pulley arm to engage said load mechanism.

18. The exercise apparatus according to claim 12, further comprising a seat mounted to said frame, said seat being placed on said frame such that a user seated in said seat can perform leg extension exercises by rotating said actuating lever in a first direction and leg curl exercises by rotating said actuating lever in a second direction opposite to said first direction.

19. The exercise apparatus according to claim 18, wherein said actuating lever further comprises a first pad proximate to a free end of said actuating lever and a second pad mounted on said actuating lever between said first pad and a pivotally connected end of said actuating lever, and wherein said second pad is eccentrically rotatably mounted to said actuating lever such that it is adapted to hold a leg of a user in place between said first pad and said second pad during leg curl exercises.

20. An exercise apparatus for performing seated leg curls and seated leg extensions, the apparatus comprising:

a frame;

a pulley system mounted to said frame, said pulley system including a first main pulley, a second main pulley, and a third main pulley;

a first cable wrapped at least part of the way around said first main pulley and fixed to said first main pulley and wrapped at least part of the way around said second main pulley and affixed thereto;

a second cable wrapped at least part of the way around said first main pulley opposite said first cable and fixed to said first main pulley and wrapped at least part of the way around said second main pulley and affixed thereto;

a tensioner cable, one end of which is wrapped at least partially around said second main pulley opposite of said first cable, and the other end of which is wrapped at least partially around said third main pulley opposite of said second cable such that rotation of said first main pulley causes corresponding rotation in said second and third main pulleys;

a pulley arm reactive to the rotation of either of said second and third main pulleys, said pulley arm attached to a load mechanism;

an actuator lever attached to said first main pulley such that movement of said actuator lever causes rotation of said first main pulley, which causes corresponding rotation in said second and third main pulleys, which rotation of said second and third main pulleys causes said pulley arm to engage said load mechanism, said actuator lever being selectively adjustable in its angular orientation relative to said first main pulley; and

a seat mounted on said frame such that a user seated in said seat can perform leg extension exercises by rotating said actuating lever in a first direction and leg curl exercises by rotating said actuating lever in a second direction opposite to said first direction; and

a first pad and a second pad mounted on said actuating lever, said second pad eccentrically rotatably mounted to said lever such that it is adapted to hold a leg of a user in

place between said first pad and said second pad during leg curl exercises and such that it is adjustable to accommodate different sized legs.